

Appl. No. 09/771,277
Amdt. dated January 6, 2004
Reply to Office Action of May 2, 2003

REMARKS

This Amendment is submitted in response to the Office Action mailed September 5, 2003. At that time, claims 1-50 were pending in the application. The Office Action indicated that claim 27 contained allowable subject matter. Most of rejections set forth in the previous Office Action have been withdrawn. However, the Examiner maintained the rejection of claims 1-22, 24-26, and 29-50 under § 103(a) as being unpatentable over the article written by Hanning et al. (hereinafter "Hanning") in view of the article written by Beale and Sudmeier (hereinafter "Beale") and the rejection of claim 23 under § 103(a) as being unpatentable over Hanning in view of Beale and in further view of the article written by Li et al (hereinafter "Li"). Claim 28 was newly rejected under § 103(a) as being unpatentable over Hanning in view of Beale and further in view of the article written by Kim et al (hereinafter "Kim").

By this amendment, claims 3, 4, 23, and 29 were canceled, and claims 1, 5, 11-14, 19, 34, and 40 have been amended. The claims were amended to recite that the excitation source rasters an excitations beam onto the capillary along part or all of the length of the capillary. Rastering is discussed in the specification at pages 6, 9, 10, 13, 16, 21, and 22, shown in Figure 1 by arrows A and B, and recited in original claims 29, 40, 41, and 50. Accordingly, claims 1, 5-22, 24-28, and 30-50 are presented for reconsideration by the Examiner.

Telephonic Interview. Applicants' attorney expresses appreciation to Examiner Starsiak for discussing this application on November 14, 2003 and November 18, 2003. During those interviews, some proposed amendments to the claims were discussed which included amending claims 1 and 19 to recite that the excitation beam is rastered onto the capillary along part or all of the length of the capillary. It was agreed that the Beale secondary reference does not disclose the concept of rastering the excitation beam along the capillary and that Beale discloses an apparatus in which the excitation beam (through a confocal detection system) is kept stationary and that the capillary (mounted onto a movable table) is moved relative to the excitation beam. It was further

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agreed that the Beale reference generally discloses advantages that are obtained from "scanning the entire length of the capillary."

Another prior art reference of record, Kim et al., Analytical Chemistry, Vol. 68, No. 5, March 1, 1996, discloses a postelectrophoresis capillary scanning method in which the capillary is scanned by moving the capillary through a stationary excitation beam and detector system. Neither the Examiner nor the Applicants' attorney was aware of prior art which discloses rastering the excitation beam along a stationary electrophoresis capillary. It was also agreed that the capillary electrophoresis detection system of Beale is substantially different than the capillary electrophoresis detection system of the primary reference, Hanning, and that of the claimed invention. Hanning and the claimed invention both disclose capillary electrophoresis systems in which the capillary is a light wave guide and the fluorescent light emitted is detected at the end of the capillary and not transversely as with Beale. An unresolved issue from the telephonic interviews was the appropriate scope of Beale's disclosure.

Claim Rejections – 35 U.S.C. § 103. The Office Action rejected claims 1-22, 24-26, and 29-50 under 35 U.S.C. § 103(a) as being unpatentable over Hanning in view of Beale. The Applicants respectfully traverse this rejection and submit that the claimed invention would not have been obvious from the combined disclosure of Hanning and Beale.

Both Hanning and Beale refer to the capillary electrophoresis work of Mathies.¹ Hanning, page 3423, right column, states:

Mathies et al. have developed a *scanning* confocal microscope for capillary array detection.³⁰⁻³⁷ This scheme has *certain drawbacks, such as the need for scanning optics* and the critical alignment and positioning required due to the shallow focal depth of the objective. (emphasis added).

Beale, page 3367, right column, states:

¹ See references 5-6 in Beale and references 30-37 in Hanning.

The system we present is similar to the capillary array electrophoresis system described by Mathies and co-workers^{5,6} for continuously monitoring the outlet ends of several capillaries in a bundle. We have adapted Mathie's geometry to scan the entire length of a single capillary.

The only difference between Mathies' confocal detection system and Beale's confocal detection system is that Beale uses the scanning confocal system to scan the length of a single capillary by moving the capillary and fixing the confocal detection system, while Mathies used the same confocal system to scan transversely across an array of fixed capillaries. Nevertheless, the limitations recognized by Hanning still remain, i.e., the need for scanning optics and critical alignment and positioning, which were not addressed by Beale. Therefore, one skilled in the art would not have been motivated to modify the Hanning's liquid core waveguide device to be a scanning system according to Beale because Hanning specifically rejected a scanning system because of "the need for scanning optics and the critical alignment and positioning required."

Moreover, Beale's manuscript appeared in the literature one year prior to Hanning's manuscript. Hanning's intention was to provide a faster, more sensitive, simpler, high throughput method for DNA sequencing. Yet Hanning was not motivated to use a scanning source with his liquid core waveguide system, because the belief at the time was that such a scanning source would be too complicated to implement because of the drawbacks identified above.

A Prima Facie Case of Obviousness Has Not Been Established

A *prima facie* case of obviousness is established only if the Examiner shows that (1) there is some teaching, suggestion, or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings; (2) there is a reasonable expectation of success; and (3) the prior art teaches or suggests all of the claim limitations. See MPEP 2142.

1. There is Insufficient Teaching Or Motivation To Combine Hanning and Beale. The mere fact that references can be combined or modified does not render the resultant combination obvious unless there is some teaching that suggests the desirability of the combination. *See e.g., In re Mills*, 16 USPQ2d 1430, 1432 (Fed. Cir. 1990). In other words, even if all of the claimed elements are disclosed by the references, the claimed invention cannot be said to be obvious without some objective evidence of record that indicates why one of ordinary skill in the art would have been prompted to combine the teachings of the references and arrive at the claimed invention. *See* MPEP § 2143.01; *In re Lee*, 61 USPQ2d 1430, 1433 (Fed. Cir. 2002).

In the present case, Beale teaches a method for detecting fluorescent emissions in capillary electrophoresis systems by using a confocal microscope that scans the length of the capillary. *See* Beale, page 3367. Such a detection system is based upon and employs the scanning confocal microscope system taught by "Mathias and co-workers for continuously monitoring the outlet ends of several capillaries in a bundle." *Id.* In Beale, the scanning is achieved by moving the capillary on a traverse stage and presenting it to a fixed point light source and detection system. If the Hanning capillary were "scanned" according to the teachings of Beale, Hanning's Teflon coating would have to be removed for fluorescence detection to occur, otherwise the Teflon coating would prevent the confocal point light source and detection system from functioning. If Hanning's Teflon coating were removed, it would obviate the principle of internal reflection using a liquid core waveguide, which Hanning teaches, thus destroying the function of Hanning's device.

MPEP 2143.01 states that "[i]f the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious. *In re Ratti*, 270 F.2d 810, 123 USPQ 349 (CCPA 1959). In this case, modifying the device of Hanning such that the Hanning capillary is "scanned" as taught by Beale would not merely change the principle of operation of Hanning's device, it would destroy it.

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Moreover, in order for Hanning to use a liquid core waveguide and a confocal detection system, the detector would need to be moved to one end of the capillary, which would obviate the confocal arrangement which Beale teaches, plus with the capillary moving (as taught by Beale), the confocal detection system would require continuously focusing objectives, which would be an impractical situation.

From the foregoing, Applicants respectfully submit that neither Hanning nor Beale suggests the desirability of the combination, because to do so would "change the principle of operation of the prior art invention being modified." Accordingly, as Hanning dismisses *scanning* confocal microscope systems as being inadequate and limited, the Applicants submit that there is no teaching that would have led one of ordinary skill to combine Hanning and Beale. As such, the combination of Hanning and Beale may not be used to reject the present claims under § 103(a). Withdrawal of this rejection is respectfully requested.

2. All the claim limitations are not taught by the prior art. "To establish a *prima facie* case of obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art." MPEP § 2143.03. In this case, claim 1 recites "an excitation source for rastering an excitation beam onto the capillary along part or all of the length of the capillary" and "determining the location of particles within the capillary based upon the location of the rastered excitation beam." The specification discusses rastering at pages 6, 9, 10, 13, 16, 21, and 22, and shown in Figure 1 by arrows A and B. The term rastering refers to moving the excitation beam along the capillary. It implies the capillary is stationary, while the excitation beam moves along its length. Neither Hanning nor Beale discloses "rastering an excitation beam onto the capillary" and "determining the location of particles within the capillary based upon the location of the rastered excitation beam." Thus, "all the claim limitations" are not "taught or suggested by the prior art," and *prima facie* obvious is not established.

3. The invention must be viewed as a whole. MPEP 2144.08 states:

When evaluating the scope of a claim, every limitation in the claim must be considered. See, e.g., *In re Ochiai*, 71 F.3d 1565, 1572, 37 USPQ2d 1127, 1133 (Fed. Cir. 1995). However, the claimed invention may not be dissected into discrete elements to be analyzed in isolation, but must be considered as a whole. See, e.g., *W.L. Gore & Assoc., Inc. v. Garlock, Inc.*, 721 F.2d 1540, 1548, 220 USPQ 303, 309 (Fed. Cir. 1983); *Jones v. Hardy*, 727 F.2d 1524, 1530, 220 USPQ 1021, 1026 (Fed. Cir. 1983) (“treating the advantage as the invention disregards the statutory requirement that the invention be viewed ‘as a whole’”).

During the telephonic interviews, Applicants’ attorney and the Examiner agreed that Beale discloses some *advantages* from scanning the entire length of the capillary, such as quicker analysis time and the possibility of using a shorter effective column length. The Examiner suggested that these advantages may support a broad interpretation of Beale, *i.e.*, that Beale discloses the desirability of any capillary scanning technique regardless of whether the technique involves a stationary excitation source and detection system with a moving capillary or a stationary capillary with a moving excitation source. However, the Applicants do not claim to have invented the *advantages* from scanning the entire length of the capillary. Applicants claim particular apparatus and methods of capillary electrophoresis which include structures and method steps that are not disclosed or suggested by the cited prior art individually or in combination. The invention must be examined as a whole; as noted above, “treating the advantage as the invention disregards the statutory requirement that the invention be viewed ‘as a whole.’” The fact that Beale discloses certain advantages of scanning a capillary, but in a different manner than the claimed invention, does not mean that the claimed invention would have been obvious. The claimed invention must be examined, not the advantages obtained from the claimed invention. Since the claimed invention as a whole is not taught or suggested by the combined prior art, Applicants submit that *prima facie* obviousness is not established.

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4. Disclosure of genus does not establish prima facie obviousness of claimed species.

MPEP 2144.08 states: "The fact that a claimed species or subgenus is encompassed by a prior art genus is not sufficient by itself to establish a *prima facie* case of obviousness. *In re Baird*, 16 F.3d 380, 382, 29 USPQ2d 1550, 1552 (Fed. Cir. 1994)." In this case, the Beale reference discloses one technique of "scanning" a capillary by mounting the capillary on a movable table and utilizing a stationary confocal detection system. This is essentially one "species" within the general "genus" or field of "scanning." During the telephonic interviews, the Examiner suggested that the Beale's disclosure of one specific species may be considered a general disclosure of the entire field (or genus) of capillary electrophoresis scanning. The rejected claims are drawn to a different "species" or technique of scanning a capillary. According to the rule set forth in *In re Baird*, Applicants respectfully submit that Beale's general disclosure of scanning a capillary does not by itself establish *prima facie* obviousness of the claimed scanning apparatus and method.

In view of the foregoing, Applicants submit that claims 1-22, 24-26, and 29-50 would not have been obvious from the combined disclosure of Hanning and Beale. Withdrawal of the rejection and allowance of these claims is respectfully requested.

Rejection of claim 23 under 35 U.S.C. § 103(a)

Claim 23 was rejected under §103(a) as being unpatentable over Hanning in view of Beale and in further view of the article written by Li. The Li reference was cited for the purpose of disclosing the use of a fiber optic to transmit light from the end of the capillary to a photodiode. The Li reference fails to disclose those claim features that are lacking in the Hanning and Beale references, including, but not limited to, the rastering feature discussed above. Therefore, Applicants submit that claim 23 would not have been obvious from the combination of references. Withdrawal of the rejection is respectfully requested.

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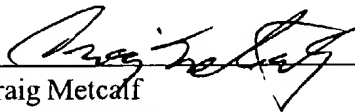
Rejection of claim 28 under 35 U.S.C. § 103(a)

Claim 28 was newly rejected under § 103(a) as being unpatentable over Hanning in view of Beale and further in view of Kim. The Kim reference was cited for the purpose of disclosing the use of a narrow band pass filter. The Kim reference fails to disclose those claim features that are lacking in the Hanning and Beale references, including, but not limited to, the rastering feature discussed above. Therefore, Applicants submit that claim 28 would not have been obvious from the combination of references. Withdrawal of the rejection is respectfully requested.

CONCLUSION

In view of the foregoing, the Applicants submit that claims 1, 5-22, 24-28, and 30-50 are in a condition for immediate allowance. If there are any remaining issues preventing allowance of the pending claims that may be clarified by telephone, the Examiner is requested to call the undersigned.

Respectfully submitted,



Craig Metcalf
Reg. No. 31,398
Attorney for Applicants

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MADSON & METCALF
Gateway Tower West
15 West South Temple, Suite 900
Salt Lake City, Utah 84101
Telephone: 801/537-1700